CLAIMS

What is claimed is:

1. A polymer blend for fabricating medical products comprising:

a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature; and

a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature.

2. The blend of claim 1 wherein the first melting point temperature is less than about 100°C.

3. The blend of claim 1 wherein the first melting point temperature is less than about 90°C.

4. The blend of claim 1 wherein the first 1,2 polybutadiene is a first syndiotactic 1,2 polybutadiene.

5. The blend of claim 4 wherein the first syndiotactic 1,2 polybutadiene is a low crystallinity syndiotactic 1,2 polybutadiene.

6. The blend of claim 4 wherein the second 1,2 polybutadiene is a second syndiotactic 1,2 polybutadiene.

7. The blend of claim 6 wherein the second syndiotactic 1,2 polybutadiene is a second low crystallinity syndiotactic 1,2 polybutadiene.

8. The blend of claim 1 further comprising an effective amount of a hindered amine.

9. A polymer blend for fabricating medical products comprising:

a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature;

a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature; and

the blend having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

10. The blend of claim 9 wherein the first melting point temperature is less than about 100°C.

11. The blend of claim 9 wherein the first melting point temperature is less than about 90°C.

12. The blend of claim 9 wherein the first 1,2 polybutadiene is a first syndiotactic 1,2 polybutadiene.

13. The blend of claim 12 wherein the first syndiotactic 1,2 polybutadiene is a low crystallinity syndiotactic 1,2 polybutadiene.

14. The blend of claim 12 wherein the second 1,2 polybutadiene is a second syndiotactic 1,2 polybutadiene.

15. The blend of claim 14 wherein the second syndiotactic 1,2 polybutadiene is a second low crystallinity syndiotactic 1,2 polybutadiene.

16. The blend of claim 9 further comprising an effective amount of a hindered amine.

17. A tubing comprising:

a sidewall of a polymer blend comprising a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature, and a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature.

18. The tubing of claim 17 wherein the first melting point temperature is less than about 100°C.

19. The tubing of claim 17 wherein the first melting point temperature is less than about 90°C.

20. The tubing of claim 17 wherein the first 1,2 polybutadiene is a first syndiotactic 1,2 polybutadiene.

21. The tubing of claim 20 wherein the first syndiotactic 1,2 polybutadiene is a low crystallinity syndiotactic 1,2 polybutadiene.

22. The tubing of claim 20 wherein the second 1,2 polybutadiene is a second syndiotactic 1,2 polybutadiene.

23. The tubing of claim 22 wherein the second syndiotactic 1,2 polybutadiene is a second low crystallinity syndiotactic 1,2 polybutadiene.

24. The tubing of claim 17 further comprising an effective amount of a hindered amine.

25. A tubing comprising:

a sidewall of a polymer blend comprising a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature, a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature; and

the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

26. The tubing of claim 25 wherein the first melting point temperature is less than about 100°C.

27. The tubing of claim 25 wherein the first melting point temperature is less than about 90°C.

28. The tubing of claim 25 wherein the first 1,2 polybutadiene is a first syndiotactic 1,2 polybutadiene.

29. The tubing of claim 28 wherein the first syndiotactic 1,2 polybutadiene is a low crystallinity syndiotactic 1,2 polybutadiene.

30. The tubing of claim 28 wherein the second 1,2 polybutadiene is a second syndiotactic 1,2 polybutadiene.

31. The tubing of claim 30 wherein the second syndiotactic 1,2 polybutadiene is a second low crystallinity syndiotactic 1,2 polybutadiene.

32. The tubing of claim 25 further comprising an effective amount of a hindered amine.

33. A tubing comprising:

a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature;

a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature;

the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys; and

wherein the tubing is capable of delivering fluid in response to energy applied to the tubing by a medical infusion pump for a 24 hour period without generating visible particulate matter.

34. The tubing of claim 33 wherein the tubing has an original cross-sectional diameter and retains 95% of the original cross-sectional diameter after stretching the tubing with a 5 lb weight for 10 seconds.

35. A tubing for use with an infusion pump comprising:

a first low-crystallinity syndiotactic 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature;

a second low-crystallinity syndiotactic 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature;

the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys; and

wherein the tubing is capable of delivering fluid in response to energy applied to the tubing by a medical infusion pump for a 24 hour period without generating visible particulate matter.

36. The tubing of claim 35 wherein the tubing has an original cross-sectional diameter and retains 95% of the original cross-sectional diameter after stretching the tubing with a 5 lb weight for 10 seconds.

37. A multiple layered tubing comprising:

a first layer of a polymer blend comprising a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature, and a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature; and

a second layer of a polymeric material attached to the first layer and concentrically disposed with respect thereto.

38. The tubing of claim 37 wherein the second layer is a polyolefin.

39. The tubing of claims 38 wherein the polyolefin is obtained from a polymerizing an olefin.

40. The tubing of claim 39 wherein the olefin is selected from the group consisting of cyclic olefins, and acyclic olefins.

41. The tubing of claim 39 wherein the polyolefin is a 1,2 polybutadiene.

42. The tubing of claim 39 wherein the polyolefin is a syndiotactic 1,2 polybutadiene.

43. The tubing of claim 39 wherein the polyolefin is a low crystallinity syndiotactic 1,2 polybutadiene.

44. The tubing of claim 43 wherein the second layer is concentrically positioned about the first layer.

45. The tubing of claim 43 wherein the second layer is concentrically positioned inside the first layer.

46. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less 50%.

47. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less than about 45%.

48. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of less than about 40%.

49. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 13% to about 40%.

50. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 15% to about 30%.

51. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of less than about 90°C.

52. The tubing of claim 45 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of higher than about 91°C but less than 120°C

53. A multiple layered tubing comprising:

a first layer of a polymer blend of a first low crystallinity syndiotactic 1,2 polybutadiene having a first melting point temperature lower than about 90°C and present from about 1% to about 99% by weight of the blend and a second low crystallinity syndiotactic 1,2 polybutadiene having a second melting point temperature higher than about 91°C and present from about 1% to about 99% by weight of the blend; and

a second layer of a polymeric material attached to the first layer and concentrically disposed with respect thereto.

54. The tubing of claim 53 wherein the second layer is a polyolefin.

55. The tubing of claim 54 wherein the polyolefin is obtained from polymerizing an olefin.

56. The tubing of claim 55 wherein the olefin is selected from the group consisting of cyclic olefins and acyclic olefins.

57. The tubing of claim 55 wherein the polyolefin is a 1,2 polybutadiene.

58. The tubing of claim 57 wherein the 1,2 polybutadiene is a syndiotactic 1,2 polybutadiene.

59. The tubing of claim 57 wherein the 1,2 polybutadiene is a low crystallinity syndiotactic 1,2 polybutadiene.

60. The tubing of claim 59 wherein the second layer is concentrically positioned about the first layer.

61. The tubing of claim 59 wherein the second layer is concentrically positioned inside the first layer.

62. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less 50%.

63. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less than about 45%.

64. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of less than about 40%.

65. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 13% to about 40%.

66. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 15% to about 30%.

67. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of less than about 90□C.

68. The tubing of claim 59 wherein the low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of higher than about 91°C but less than 120°C

69. A multiple layered tubing comprising:

a first layer of a polymer blend comprising a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature, and a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature;

a second layer of a polymeric material attached to the first layer and concentrically disposed with respect thereto; and

wherein the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

70. A multiple layered tubing comprising:

a first layer of a polymer blend of a first low crystallinity syndiotactic 1,2 polybutadiene having a first melting point temperature less than about 90°C and present from about 1% to about 99% by weight of the blend and a second low crystallinity syndiotactic 1,2 polybutadiene having a second melting point temperature higher than about 91°C and present from about 1% to about 99% by weight of the blend;

a second layer of a polymeric material attached to the first layer and concentrically disposed with respect thereto; and

wherein the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

71. The tubing of claim 70 wherein the second layer is a polyolefin.

72. The tubing of claims 71 wherein the polyolefin is obtained from polymerizing an olefin.

73. The tubing of claim 72 wherein the olefin is selected from the group of cyclic olefins and acyclic olefins.

74. The tubing of claim 71 wherein the polyolefin is a syndiotactic 1,2 polybutadiene.

75. The tubing of claim 71 wherein the polyolefin is a third low crystallinity syndiotactic 1,2 polybutadiene.

76. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less than 50%.

77. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity less than about 45%.

78. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of less than about 40%.

79. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 13% to about 40%.

80. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a crystallinity of from about 15% to about 30%.

81. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of less than about 90°C.

82. The tubing of claim 75 wherein the third low crystallinity syndiotactic 1,2 polybutadiene has a melting point temperature of higher than about 91°C but less than about 120°.

83. A multiple layered tubing for an infusion pump comprising:

a first layer of a first polymer blend of a first low crystallinity syndiotactic 1,2 polybutadiene having a first melting point temperature less than about 90°C and present from about 1% to about 99% by weight of the first blend and a second low crystallinity syndiotactic 1,2 polybutadiene having a second melting point temperature higher than about 91°C and present from about 1% to about 99% by weight of the first blend;

a second layer of a polymeric material concentrically disposed within the first layer and attached thereto and being of a second polymer blend comprising a third low crystallinity syndiotactic 1,2 polybutadiene present from about 1% to about 99% by weight of the second blend and having a third melting point temperature, and a fourth 1,2 polybutadiene present from about 1% to about 99% by weight of the second blend and having a fourth melting point temperature higher than the third melting point temperature; and

wherein the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

84. The tubing of claim 83 wherein the tubing has an original cross-sectional diameter and retains 95% of the original cross-sectional diameter after stretching the tubing with a 5 lb weight for 10 seconds.

85. The tubing of claim 84 wherein the third melting point temperature is less than about 90°C.

86. A multiple layered tubing comprising:

a first layer of a first low crystallinity syndiotactic 1,2 polybutadiene;

a second layer of a second low crystallinity syndiotactic 1,2 polybutadiene; and

wherein the tubing having been exposed to sterilizing radiation from about 15 kGys to about 45 kGys.

87. A tubing comprising:

a first 1,2 polybutadiene present from about 1% to about 99% by weight of the tubing and having a first melting point temperature;

a second 1,2 polybutadiene present from about 1% to about 99% by weight of the tubing and having a second melting point temperature higher than the first melting point temperature; and

the tubing having been exposed to a heat treatment process.

88. The tubing of claim 87 wherein the tubing has a first tendency to increase in modulus of elasticity over time prior to being exposed to the heat treatment process and a second tendency to increase in modulus of elasticity over time after being exposed to the heat treatment process, wherein the second tendency is less than the first tendency.

89. The tubing of claim 87 wherein the tubing has a modulus of elasticity less than about 5,000 psi.

90. The tubing of claim 89 wherein the tubing has a yield strength of from about 1500 psi to about 600.

91. A method for fabricating a tubing comprising the steps of:

providing a blend of a first 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a first melting point temperature and a second 1,2 polybutadiene present from about 1% to about 99% by weight of the blend and having a second melting point temperature higher than the first melting point temperature;

extruding the blend into a tubing; and

heating the tubing to reduce the tendency of the tubing to crystallize over time.